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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/991,909 | 11/26/2001 | Tosuke Kawada | 111196 | 7557 |
| 25944 | 7590 | 01/14/2005 | EXAMINER | |
| OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320 | | | CHAWAN, SHEELA C | |
| | | | ART UNIT | PAPER NUMBER |

2625

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/991,909 | KAWADA, TOSUKE | |
| | Examiner | Art Unit | |
| | Sheela C Chawan | 2625 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/26/01</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The Examiner has approved drawings filed on 11/26/01.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(a) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Toh

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et al., (US.6,242,765 B1), in view of Baldwin et al., (US. 6,243,164 B1).

As to claim 1, Toh discloses an apparatus for detecting a coplanarity of a plurality of leads of an electronic component that laterally extends from a main body (fig 4) thereof, comprising:

a holding device, which holds the main body of the electronic component at an upper surface of the main body (fig 4b, element 27 pickup head corresponds to holding device, column 5, lines 1-7, note electronic component corresponds to leads of packaged intergrated circuit fig 4b element 100B);

an image taking device which faces the electronic component held by the holding device and has an optical axis that is inclined by a predetermined angle relative to a plane containing a bottom surface of the main body such that in a direction from the image taking device toward the main body, the optical axis goes down in a direction from the upper surface to the bottom surface (column 4, lines 16- 44);

an image processing device which processes an image of respective end portions of the leads taken by the image taking device and thereby determines the coplanarity of the leads (column 7, lines 34- 47).

Toh is silent about a background forming device which is provided on one of opposite sides of the electronic component that is opposite to the other side thereof on which the image taking device is provided, and which forms a background having an optical characteristic different from an optical characteristic of the leads.

Baldwin discloses a machine vision system for inspecting the leads of packaged intergrated circuits. The system comprises:

a background forming device which is provided on one of opposite sides of the electronic component that is opposite to the other side thereof on which the image taking device is provided, and which forms a background having an optical characteristic different from an optical characteristic of the leads (column 3, lines 3-11, 12-38, column 4, line 27 through column 5, line 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Toh to include a background forming device which is provided on one of opposite sides of the electronic component that is opposite to the other side thereof on which the image taking device is provided, and which forms a background having an optical characteristic different from an optical characteristic of the leads. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Toh by the teaching of Baldwin in order to reduce the size of the overall vision system and to reduce the cost of assembly, to integrate with particular lightings techniques, or to facilitate any combination of these goals (as suggested by Baldwin at column 4, lines 47- 57).

As to claim 2, Baldwin discloses an apparatus wherein the background forming device comprises a light emitter, which emits a light toward the electronic component and the image taking device (fig 2, element 55, corresponds to light emitter, column 4, lines 57- 60, column 4, lines 48-51, 53- 62).

As to claim 3, Baldwin discloses an apparatus wherein the holding device (fig 2, element 28, corresponds to holding device (column 2, lines 40- 47, column 4, lines 3-26) comprises a rotating device which rotates (column 5, lines 10-18) electronic

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component about an axis line that is perpendicular to the upper surface of the main body and passes through a substantial center of the upper surface (column 7, lines 33-65).

As to claim 4, Baldwin discloses an apparatus wherein the main body of the electronic component has, in a plan view thereof, a shape having a plurality of sides from each of which the leads laterally extend, and wherein the rotating device rotates the electronic component to an angular position at which said each of the sides of the main body extends in a direction substantially perpendicular to the optical axis of the image taking device, at a position between the axis line and the optical is axis (column 7, lines 33-65).

As to claim 5, Baldwin discloses an apparatus further comprising a judging device, which judges, based on the coplanarity determined by the image processing device, whether the electronic component is acceptable (column 2, lines 60-67, column 4, lines 27-40).

As per claim 6, claim 6 recites similar limitation as claim 1 above and similarly analyzed. Toh discloses an apparatus for detecting a condition of an electronic component, comprising:

- a coplanarity detecting apparatus (column 1, lines 21-63); and

- a second image taking device (fig 1, element 11, optical module, column 4, lines 16-20) which is different from a first image taking device as the image taking device of the coplanarity detecting apparatus and which takes an image of at least the bottom surface of the main body of the electronic component as viewed in a direction

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perpendicular to the bottom surface of the main body (column 4, lines 16-20, column 6, lines 15- 31),

wherein the image processing device comprises, in addition to a first image processing portion which determines the coplanarity, a second image processing portion which processes the image of the electronic component taken by the second image taking device and thereby determines at least one positional error of the electronic component relative to the holding device in at least one direction parallel to the upper surface of the main body (note, compensation factor corresponds to error correction based on the coordinates of all leads on the IC and the parameters of the IC such as coplanarity, pitch, etc., for electronic component, column 7, lines 14- 65).

As per claim 7, Toh discloses an apparatus wherein the first and second image taking devices are provided at respective positions at which the first and second image taking devices can take the image of the leads of the electronic component and the image of the bottom surface of the electronic component (column 4, lines 16-20), respectively, in a state in which the electronic component is positioned at a same position (column 7, lines 34- 65).

As per claim 8, Baldwin discloses an apparatus, further comprising an image-taking-device control portion which first controls the first image (note, a set of leads images corresponds to first image) taking device to take the image of the electronic component and then controls the second image taking device to take the image of the electronic component (note, second image corresponds to a set of leads, column 5, lines 18- 67).

As to claim 9, Baldwin discloses an apparatus wherein the holding device comprises a rotating device which rotates the electronic component about an axis line that is perpendicular to the upper surface of the main body and passes through a substantial center of the upper surface and wherein the image-taking-device control portion controls the rotating device to rotate the electronic component to an angular position at which the electronic component (column 5, 10- 67) is to be mounted on a circuit substrate (fig 5, element 80 , corresponds to rotating the device through central axis) , and subsequently controls the second image taking device to take the image of the electronic component (abstract, column 7, lines 33- 65, column 8, lines 14- 38, 42- 67, column 9, lines 1-16).

As per claim 10, claim 10 recites similar limitation as claim 1 above and similarly analyzed. Baldwin discloses the step for mounting at least one electronic component on a circuit substrate (fig 3, element 10, corresponds to electronic component on a circuit substrate), comprising:

an electronic-component-condition detecting (note, electronic component on a circuit substrate corresponds to leads of packaged integrated circuit by machine vision, column 1, lines 7- 12, column 2, lines 60-67);

a supporting device, which supports the circuit substrate (column 2, lines 40-47, 60-67, column 4, lines 3-26);

a moving device which moves, while correcting the positional error of the electronic component detected by the image processing device of the electronic-component-condition detecting device, the holding device holding the electronic

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component, from the supplying device to the supporting device via the first and second image taking devices, and allows the holding device to mount the electronic component on the circuit substrate supported by the supporting device (column 4, lines 18- 26, column 5, lines 18-67); and

a coplanarity-utilizing control means for controlling the moving device while utilizing the coplanarity detected by the coplanarity detecting apparatus of the electronic-component- condition detecting apparatus (column 3, lines 3- 37, column 4, lines 18-40).

As to claim 11, Baldwin discloses a system wherein the coplanarity detecting apparatus comprises a judging device which judges, based on the coplanarity detected by the image processing device, whether the electronic component is acceptable, and wherein the coplanarity-utilizing control means comprises a discarding control means for controlling, when the judging device judges that the electronic component is not acceptable, the moving device to discard the electronic component at a predetermined discarding position (column 3, lines 3-37, column 6, lines 15-46, column 8, lines 43- 67, column 9, lines 1-16).

As to claim 12, Baldwin discloses a system wherein the moving device comprises:

an X-axis slide which is movable in an X-axis direction parallel to an X axis of an X-Y coordinate plane parallel to a surface of the circuit substrate (column 4, lines 27- 40);

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an X-axis-slide moving device, which moves the X-axis slide to an arbitrary position in the X-axis direction (column 5, lines 18- 38, 54- 67);

a Y-axis slide which is supported by the X-axis slide s movable relative to the X-axis slide in a Y-axis direction parallel to a Y axis of the X-Y coordinate plane that is perpendicular to the X axis (column 6, lines 47- 67); and

a Y-axis-slide moving device which moves the Y-axis slide to an arbitrary position in the Y-axis direction, and wherein the holding device is supported by the Y-axis slide (column 7, lines 1-26).

As to claim 13, Baldwin discloses a system wherein the first and second image taking devices are provided at respective positions at which the first and second image taking devices can take the image of the leads of the electronic component (column 4, lines 27- 40, column 5, lines 18- 38, 54-67, column 6, lines 47- 67, column 7, 1-26).

Baldwin is silent about image of the bottom surface of the electronic component, respectively, in a state in which the electronic component is on a path of movement thereof caused by a movement of the Y-axis slide relative to the X-axis slide.

Toh discloses an optical inspection system for integrated circuit using imaging techniques wherein the bottom surface of the electronic component, respectively, in a state in which the electronic component is on a path of movement thereof caused by a movement of the Y-axis slide relative to the X-axis slide (column 3, lines 65 through column 4, lines 1-5, column 5, lines 1-59, column 6, lines 12-31, column 7, lines 1-13, 34-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Baldwin to include an image of the bottom surface of the electronic component, respectively, in a state in which the electronic component is on a path of movement thereof caused by a movement of the Y-axis slide relative to the X-axis slide. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Baldwin by the teaching of Toh in order to reduce the amount of time to switch dual-sided ICs, during inspection. Higher throughput may be further achieved (as suggested by Toh at column 3, lines 11-22).

As to claim 14, Baldwin discloses a system wherein the background forming device is provided on the X-axis slide (column 3, lines 3-38, column 5, lines 18-53).

As to claim 15, Baldwin discloses a system wherein the first image taking device comprises a camera which is provided at a position where the camera faces the background forming device through the electronic component held by the holding device (fig 2, element 28, column 4, lines 47- 67, column 5, lines 1-38).

As to claim 16, Baldwin discloses a system wherein the second image taking device comprises a direction changing device which is provided on the X-axis slide such that a first portion of the direction changing device faces the electronic component held by the holding device, and a camera which is also provided on the X-axis slide such that the camera faces a second portion of the direction changing device (column 5, lines 10-18, column 6, line 36 through column 7, lines 1- 26).

Other prior art cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lebeau et al., (US. 5,563,703) discloses lead coplanarity inspection apparatus and method thereof.

Linker, Jr. et al., (US. 4,686,637) discloses apparatus and method for lead integrity determination for dip devices.

Toh (US. 6,141,040) discloses measurement and inspection of leads on integrated circuit packages.

Roy et al., (US. 5,956,134) discloses inspection system and method for leads of semiconductor devices.


Cullen et al., (US. 5,805,722) discloses method and apparatus for locating, inspecting and placing large leaded devices.

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday - Thursday 8 - 6.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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Group Art Unit 2625
Jan 05, 2005